The Solar System

Volume IV, No. 4 Nov.-Dec., 1946

SOLITE METALLIZED PAPER CAPACITORS. See Page 5.

Solar Manufacturing Corporation
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New York 17, N. Y.

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Readers Write

Joliet, Illinois

Sir:

Several of my customers have asked—Is it possible to put some kind of a filter in the a-c line to take the flicker out of fluorescent lights? How big a condenser would be needed? I bet it would be a whopper.

H. A. ROLLINS.

Flicker in fluorescent lamps is inherent in the lamps themselves as all lamp manufacturers will tell you. Flicker is not as noticeable when two-tube fixtures with properly designed ballasts are used. One lamp maker gives the following comparative values of 60-cycle flicker: Single daylight tube, 55; single white tube, 35; daylight tube in dual fixture, 25; white tube in dual fixture, 16; 40 watt tungsten lamp, 13; 100 watt tungsten lamp, 5.—Ed.

•

Los Angeles 35, Calif.

Sir:

Do you supply a binder or folder to keep the *Solar System* in? Or please give me an idea.

T. E. DIETENHOFER.

Sorry. We have no binders available. Why not punch your copies to fit a small loose-leaf notebook cover from the nearest 5 and 10?—Ed.

•

Brooklyn 25, N. Y.

Sir:

Being a constant buyer of capacitors, I finally came to the conclusion that Solar capacitors are the best.

MELVIN SILVERMAN.

•

New York 7, N. Y.

Sir:

I would like very much to have some comprehensive articles on electrolytic capacitors, dealing especially with variations of capacitance with age, operating voltage, etc. It seems to me that very little is known about electrolytics and such a series of articles would be well received.

WALTER IRA WEISS.

We've such an article in preparation and hope to print it in an early issue.—Ed.

Bronx 63, N. Y.

Sir:

Your article on radio interference in the July-August issue was most helpful. Some of the subjects I would like to see covered in your magazine are hi-fi amplifiers and test equipment.

C. L. GOEBEL.

Sorry, but we're not trying to take the place of the regular radio magazines.—Ed.

•

Middle Village, N. Y.

Sir:

How about an article on finding the size of capacitors for raising power factor?

F. WITTICK.

Any other readers want such an article?—Ed.

•

LESLIE G. THOMAS ELECTED VICE-PRESIDENT OF SOLAR

Will Supervise Production at All Solar Plants

Leslie G. Thomas has been elected Vice-President in Charge of Manufacturing of Solar Manufacturing Corporation, it was announced recently by Paul Hetenyi, President.

Mr. Thomas will have complete supervision of production at Solar's plants in Chicago, Ill., and Bayonne and North Bergen, N. J. He has had extensive experience in the various manufacturing phases of the radio parts industry and was recently Vice-President and Works Manager of International Resistance Company, Philadelphia.

OUR COVER PHOTO

This picture shows both a 1 mf, 200 wvdc SOLITE tubular capacitor and a conventional foil-paper tubular of the same rating. You can see why we say "When space is tight, use SOLITE!"

The Solar System

Vol. IV, No. 4 November-December, 1946

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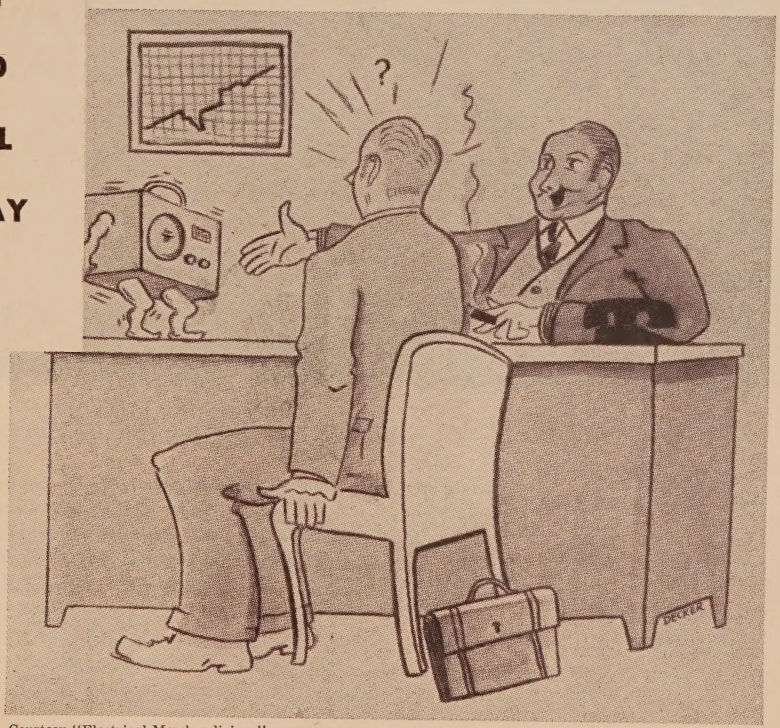
, by the Solar Manufacturing Corpora- appearing in this magazine may not in whole or in part without express

FILL OUT AND MAIL TODAY

The SOLITE Story

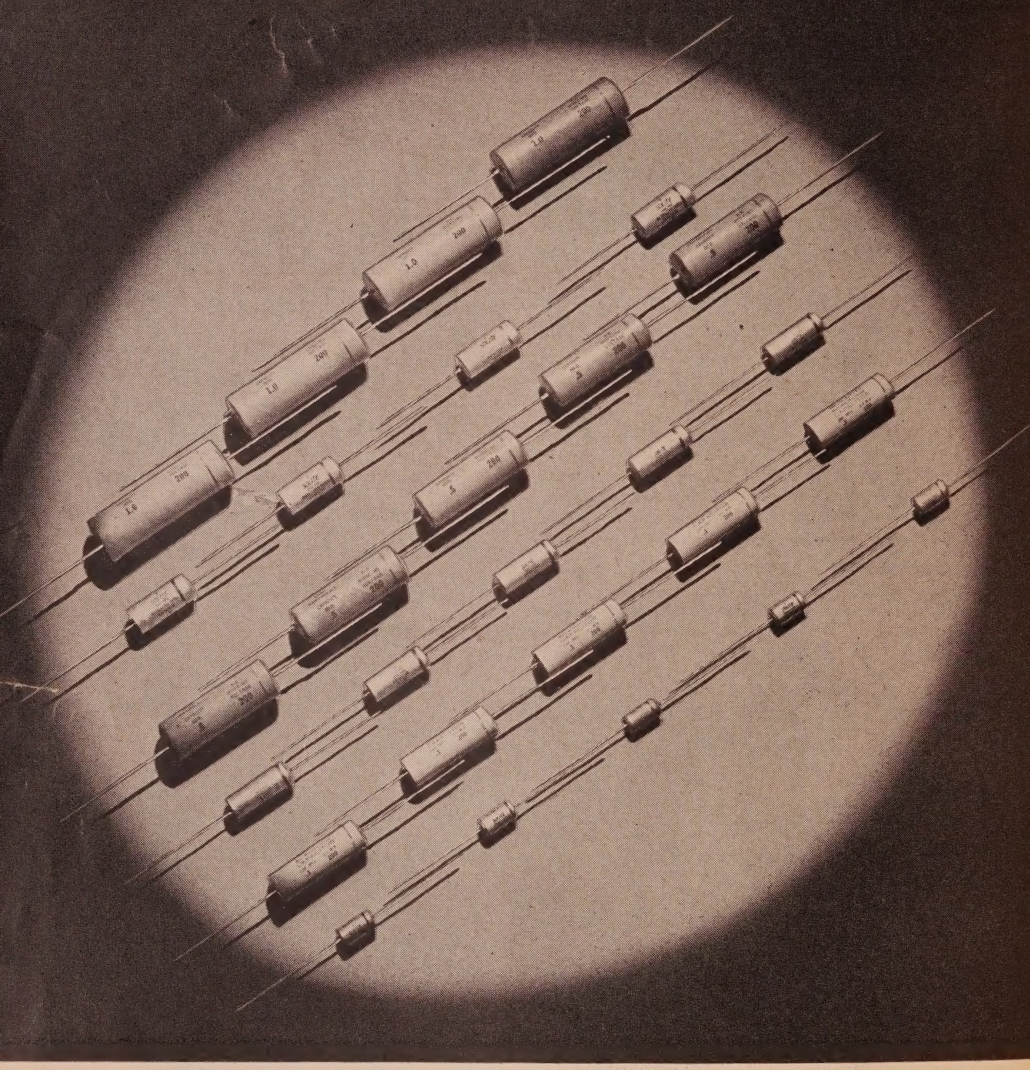
This issue is almost wholly devoted to what we think is the most important paper capacitor development in nearly 20 years—*SOLITE* metallized paper capacitors.

SOLITE is only one product of Solar's work on the development of full-performance miniature fixed capacitors. Other new capacitor developments are slated for announcement early in 1947.



Courtesy "Electrical Merchandising."

"OUR ENGINEERS FEEL THAT THIS IS THE ANSWER TO THE PORTABLE RADIO PROBLEM."



SOLITE *vs.* SEALDTITE

Here's how three Solite metallized paper tubular capacitors compare in size with foil-paper tubulars of equivalent electrical ratings. The top two rows are 1 mf, 200 wvdc capacitors; the center rows are .5 mf, 200 wvdc; and the bottom rows show .1 mf, 200 wvdc units of both Solite and conventional design.

SOLITE* Metallized Paper Capacitors—Startlingly Small and Light—are Solar's Newest Contribution to Industry

Capacitors with revolutionary self-healing aluminum film are pioneered by Solar; excellent electrical characteristics and tiny size meet today's design needs.

by James I. Cornell

Vice-President in Charge of Engineering, Solar Manufacturing Corporation

STARTLINGLY small paper capacitors have just stepped forth from Solar's research laboratories to meet today's need for small capacitors to fit into ultra-compact electronic designs.

These revolutionary capacitors are being made available to the electronic and electrical industries under the trade name "Solite," a name coined to identify the capacitors with both Solar and one of their principal characteristics — light weight. (Approximately one-fourth to one-third that of conventional designs.)

The new capacitors achieve their truly tiny size through the use of a unique self-healing metallized paper construction instead of the conventional multi-paper and foil construction.

In the Beginning

The concept of a metallized paper capacitor is in itself not new. More than 25 years ago, the Englishman, G. F. Mansbridge, sludged and hot-rolled a tin coating on condenser tissue to produce the first metallized paper capacitors. Low insulation resistance, high film resistance, heavy coatings, inductive construction and lack of reliability led to only limited use of Mansbridge-type capacitors in voice-frequency wire communication.

More recently (1942), Robert Bosch A. G., a German electrical manufacturer, made improved metallized paper ignition capacitors using a vapor-deposited zinc film. The Bosch process has been the post-war subject of considerable well-intentioned but misinformed Government-sponsored publicity, based on a survey of the Bosch equipment and plant which was made by Allied technicians.

Clarification Necessary

Consequently, it appears desirable to clarify the subject of metallized paper capacitors and to present a true picture of American developments in this field, acquainting the radio and electrical industries with the useful characteristics of metallized paper capacitors and presenting data by which design engineers may properly evaluate and apply metallized paper capacitors to their circuit requirements.

★ Trade Mark

Solite capacitors, the pioneer metallized paper units to be made available to American capacitor users, are fixed capacitors in which pure aluminum electrodes have been applied to the dielectric by means of a high vacuum vaporization process. *The resultant capacitors are not only considerably reduced in size but are also self-healing.*

Review of Conventional Construction

Before discussing these capacitors more fully, it may be well to review briefly the construction of conventional paper capacitors. Standard impregnated paper capacitors consist basically of windings of two 0.00035-inch metallic foils separated by a minimum of two or more plies of Kraft capacitor tissue. The multiple-ply dielectric is employed so that there will be little chance of failure from metallic particles or weak spots in the tissue. The probability of coincidence of weak spots in two papers is very remote.

Metallized Paper Construction

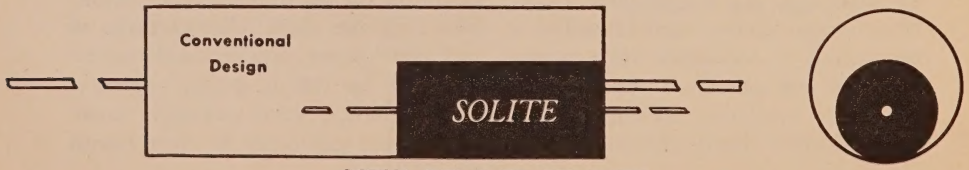
In Solite capacitors there is, of course, no foil. The capacitor electrodes are, instead, 25 to 100 millimicron thick metallic coatings deposited on the paper. The thin film contributes the remarkable property of "self-healing" to capacitors, permitting the use of a single sheet dielectric. During the course of processing metallized paper, metal inclusions in the paper and weak spots in the tissue are removed, allowing the single tissue to be worked at its maximum electrical stress.

Therefore, a Solite metallized paper capacitor will not break down at its rated working voltage until a weak spot develops in the dielectric. This should happen very rarely during life. However, if it does happen, the resulting arc discharge through the paper removes the weak spot and at the same time vaporizes the aluminum film around the weak spot, clearing the fault. The aluminum is redeposited as aluminum oxide, an excellent insulating material. Thus, the property of self-healing which assures the large factor of safety.

Space-Saving Remarkable

The drawing graphically illustrates the space-saving possible with a 1 mf, 200 wvdc Solite capacitor compared to 1 mf, 200 wvdc standard capacitor to proposed RMA specifications, using two sheets of 0.0003-inch paper impregnated in Halowax. The weight of the Solite capacitor is only 0.26 oz.; of the conventional design 1.15 oz. when using aluminum foil. Lead foil capacitors, preferred by some manufacturers, will, of course, be still heavier.

For voltage ratings above 200 wvdc, multiple layer or interleaved constructions are used. The volume and weight-saving is, of course, not as great as at the lower voltages but it is still considerable. At the same time, the self-healing characteristic is of great value.



ACTUAL SIZE, 1 MF, 200 WVDC

AVAILABILITY OF *SOLITE* CAPACITORS

Pilot quantities of Solite Capacitors may be had immediately by recognized electrical and electronic manufacturers. Solar is prepared to discuss delivery schedules of production quantities for use in those specific applications where you can take best advantage of this important advance in the capacitor art.

Manufacturing Technique

A description of the essential operations in the manufacture of Solite metallized paper capacitors will help give one a better appreciation of the complexities of the problems involved, and their effect of capacitor performance.

Paper Treatment. Ordinary capacitor tissue is treated with a coating of cellulose lacquer prior to metallizing in order to raise the breakdown voltage of the single-ply paper and to increase its insulation resistance. Coated paper is used for single-ply construction (200 wvdc rating or lower) while uncoated paper is customarily used for interleaved construction (above 200 wvdc) since the extra layer(s) of paper provides the required minimum insulation resistance and voltage breakdown strength.

Metallizing. The choice of aluminum for the metallic coating was made after extensive tests. It should be noted that the manufacturing problem of applying the aluminum coating was quite difficult to solve. A comparison of the boiling point of aluminum (1000 C at 10 microns pressure) with that of zinc (340 C at a lesser vacuum) may indicate one reason for the German use of a zinc film.

Very careful control of the process is required during the metallizing operation. The metallic film thickness is adjusted to from 25 to 100 millimicrons, depending on the speed of the machine. Uniformity of the layer applied by the continuous coating process is excellent. In calculating the film resistance, the same specific resistance may be used as for pure aluminum. The coating is applied to the full jumbo roll width of the capacitor tissue.

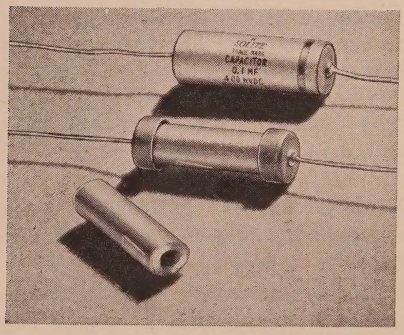
De-Metallizing and Slitting. In order to use the metallized paper in winding capacitors, it is first necessary to slit the paper into the required widths and to provide a non-metallized margin. The de-metallizing of the edge strip is combined with the slitting operation. Auxiliary metal roller discs are attached to a conventional slitting machine. The rollers are connected to a source of direct voltage. Passage of the paper under the rollers results in the removal of the

metallic film in much the same way as in the process of "self-healing." The paper is then slit in the center of the narrow path which has been completely cleared of metallic particles. The other edge of the capacitor tissue is slit directly through the metallized surface.

This method of slitting results in so-called "right hand" and "left hand" rolls which must be paired in winding in order to provide a clear margin on opposite sides of the two metallized tissues in each capacitor section.

Capacitor Winding. Solite capacitors use an ingenious method of obtaining a successful non-inductive winding. This patented method provides a positive connection between section and terminal pigtail which is considerably stronger than that usually found in capacitors of conventional construction.

During winding of the sections, the metallized edges of the capacitor tissues are edge-turned slightly to provide surfaces which can be bonded together by a metallic spray. Metal end caps, to which wire pigtails have been previously attached, are then soldered to the end surfaces of the capacitor sections.



TERMINAL CONSTRUCTION

Here is a 0.1 mf, 400 wvdc Solite tubular capacitor in various stages of assembly. Below is the wound section after the ends have been metal sprayed; above it is a section with end caps attached; at the top is an assembled and impregnated capacitor ready for use.

It should be noted that it is necessary to mask the end surfaces of the sections so that the sprayed metal layer does not cover the entire end of each section. Otherwise, impregnation would be difficult and, in some cases, incomplete.

Impregnation and Assembly. All Solite metallized paper capacitors are made by the "dry assembly" method. Each section is assembled in its housing prior to impregnation. Impregnation is the final processing operation before test and inspection in the case of tubular designs for radio applications.

Two different impregnants are used in the manufacture of Solite capacitors, the choice depending on the operating requirements. Microcrystalline hydrocarbon wax is used for single layer windings and for multiple layer windings which are intended for operation at temperatures up to 70 C. Mineral oil is used for impregnating interleaved sections intended for use up to 85 C.

Thus far it has been impractical to employ chlorinated waxes or oils as impregnants for metallized paper capacitors. Halogenated impregnants have a tendency to break down under the arc discharges which take place during the self-healing operation. Consequently, it is necessary to employ stable impregnants which are unaffected by the self-healing operation.

While this would appear to place the metallized capacitors at a disadvantage because of the approximately two to one ratio of the dielectric constant of the halogenated waxes and oils commonly used to that of mineral waxes and

oils, this is not actually the case. The size reduction realized through use of the single-layer construction or through the use of higher dielectric stresses in the interleaved windings more than makes up for the lower *K* of the impregnants used in Solite capacitors.

Incidentally, the use of mineral wax gives Solite capacitors of tubular design an additional advantage over conventional Halowax-impregnated, wax-dipped end-filled tubulars. In the case of the Solite units, the impregnating compound also serves as the protective wax film over the entire assembly. This wax has quite superior moisture-resisting properties compared to the wax used in hitherto standard designs.

Electrical Characteristics

Having outlined the essential details of manufacture of metallized paper capacitors, let us turn to their electrical characteristics. In order to properly apply such capacitors to electric circuits, a thorough understanding of these characteristics and the manner in which they have been determined is very necessary.

The rating of metallized paper capacitors must be considered entirely afresh from the criteria we have all grown accustomed to for conventional paper capacitors.

In the rating of conventional capacitors, successful withstanding of high over-voltage tests was indicative of uniformity and freedom from incipient defects; high insulation resistance was a further criterion of quality and indicated careful processing; high-temperature, over-voltage accelerated life tests were used as a means for predicting the life expectancy of conventional designs.

Let us examine these criteria as they apply to metallized paper capacitors:

Over-Voltage Test Rating. A breakdown test of two to three times rated working voltage has been considered standard for small capacitors of conventional design. This does not hold for metallized paper units where the test voltage must be restricted to from 1.25 to 1.5 times the working voltage, depending on the voltage. This in no way indicates that this is a less satisfactory construction. The ultimate breakdown voltage for a given paper thickness and impregnation is the same whether the paper is used in a foil-paper or metallized paper capacitor.

By taking full advantage of the self-healing properties of the Solite construction, the working voltage stress has been safely increased since the removal of the incipient faults in the dielectric, already described, has made the insulation more reliable. This accounts for the smaller spread between test and working voltage in the case of metallized paper construction.

It also calls for an explanation of how the rated working voltage is determined in the case of metallized paper capacitors.

Working Voltage Rating. If a direct voltage is applied to a metallized paper capacitor and a cathode-ray oscillograph is connected to the circuit as a means for detecting voltage breakdown, it will be seen that there are occasional breakdowns of weak spots in the dielectric paper as the test potential is increased. In time these incipient faults clear and there is no further indication of spark discharge. As the test voltage is again increased until it approaches the dielectric strength of the Kraft tissue, the oscilloscope shows a rapid increase in

the number of spark discharges. If the capacitor is subjected to a voltage close to its ultimate breakdown voltage[1] or to its sparking voltage,[2] the metallic coating would rapidly deteriorate as minute areas of film would be "taken out" by each discharge until an appreciable area would be "robbed" from the winding. If the sparking voltage is applied long enough, the ultimate research would, of course, be complete self-destruction of the capacitor.

By plotting the frequency of breakdowns as a function of the test voltage, it is possible to readily determine the sparking voltage and to set the rated working voltage at such a value that there will be negligible arcing or spark discharges in actual service. In rating Solite capacitors, the working voltage has been consequently set at about 60 percent of the sparking voltage under the worst conditions of operation.

As the operating temperature of the capacitor under test is increased, the frequency of breakdowns at a given test voltage is also increased. Consequently, it is necessary to de-rate the capacitor working voltage with an increase in operating temperatures. Therefore, two working voltage ratings are shown for Solite capacitors — room temperature wvdc and maximum temperature wvdc. This latter rating must not be exceeded under service conditions. Otherwise, excessive breakdowns may result, causing a lowering of both capacitance and insulation resistance.

1. Ultimate breakdown voltage may be defined as the lowest applied voltage which will cause carbonization of the dielectric and short-circuiting of a capacitor.

2. Sparking voltage may be defined as the lowest applied voltage which will cause continuous "self-healing" action to take place in a metallized paper capacitor.

The following table showing the characteristics of Solite metallized paper capacitors of the two most common voltage ratings will be of interest to circuit designers and specification engineers.

D-C Working Voltage		1 Min. Flash Test	Sparking Voltage
25 C.	70 C.	25 C.	25 C.
200	150	300	325
400	350	525	750

Where mineral oil impregnation is used for 85 C operation, the d-c working voltage at that temperature will be fifty percent of the 25 C normal working voltage rating.

Insulation Resistance Rating. The minimum insulation resistance of single-layer lacquered metallized paper capacitors will exceed 500 megohm-microfarads at 25 C. It is interesting to note that omission of the lacquer treatment drops the I-R to 100 megohm-microfarads. This is the reason why only lacquered paper is used in single-layer Solite designs. Interleaved unlacquered metallized paper capacitors will have a minimum insulation resistance of 1000 megohm-microfarads, which compares favorably with conventional capacitor designs. The change in insulation resistance with temperature in metallized paper capacitors is similar to that in the usual mineral oil designs. Roughly speaking, there is a fifty percent decrease in I-R for every 10 C rise above room temperature.

Power Factor Limits. Metallized paper capacitors show an extremely low power factor, both at 60 cycles and at 1000 cycles, averaging at about 0.3 percent

at room temperature. The low value is due to the combination of non-inductive winding, the short length of section inherent in metallized paper construction, and the use of hydrocarbon waxes or oils as the impregnating medium, coupled with the dry-assembly process of manufacture. It is interesting to note that the resistance losses which constitute the power factor loss in a capacitor are determined primarily by the electrode loss. This varies directly as the square of the width of the capacitor foil and inversely as the thickness of the dielectric. The power factor loss attributable to the impregnant itself is the same regardless of whether foil-paper or metallized paper is used.

R-F Impedance. It might be well to point out in passing that the short length of section inherent in metallized paper construction, plus the excellency of the terminal-film connection, results in an extremely low r-f impedance for Solite capacitors and self-resonant frequencies considerably higher than that hitherto approached by conventional designs.

Life Tests. Life tests on metallized paper capacitors, as pointed out previously, must be established with their operating characteristics kept in mind. Protective resistors must be used in series with *each* test sample in order to limit discharge current. Otherwise, momentary arcing of a single capacitor in a test bank will cause discharge through the fault of the entire stored energy in all other capacitors in the bank.

Rapid reduction in capacitance and insulation resistance of the sample then results. Protective resistors prevent the occurrence of this phenomenon. Thus in this respect, the life testing arrangement for metallized paper capacitors resembles that for dry electrolytics.

The applied voltage and ambient temperature during life tests should be 1.25 times the rated working voltage at the maximum recommended temperature (e.g., 70 C for hydrocarbon wax impregnated units). The standard test duration under these conditions should be 1000 hours at the end of which time the electrical characteristics should not deteriorate below the minimum guaranteed values.

Note particularly that the choice of 1.25 times working voltage for life test voltage was made deliberately to assure there was an ample factor of safety used in establishing the working voltage with reference to the sparking voltage.

In passing, it may be of interest that during the first 100 to 200 hours of life test, there is some reduction in insulation resistance caused by the generation of gas or other combustible products as the result of intermittent sparking. Capacitors recover as time elapses and ultimately the insulation resistance approaches its initial value. Life tests of from 4000 to 5000 hours under the conditions outlined previously have shown little if any change in capacitor characteristics at the conclusion of the tests

Standard Ratings and Sizes

Having discussed the factors which enter into the rating of metallized paper capacitors, it is now appropriate to compare the size of a number of standard units of tubular design with the corresponding sizes of the current RMA standards proposal for tubular paper capacitors in non-metallic housings. The table on the next page speaks for itself.

SIZE COMPARISON OF TUBULAR SOLITE AND FOIL-PAPER CAPACITORS

Rating		Dimensions in Inches	
Capacitance (mf)	WVDC (volts)	SOLITE Length x Diam.	RMA Length x Diam.
.1	200	5/8 x 3/8	1 5/8 x 1/2
.25	200	5/8 x 15/32	1 3/4 x 5/8
.5	200	1 1/8 x 15/32	2 x 3/4
1.0	200	1 1/8 x 17/32	2 1/2 x 7/8
.05	400	5/8 x 15/32	1 5/8 x 7/16
.1	400	1 1/8 x 15/32	1 5/8 x 9/16
.25	400	1 1/8 x 17/32	2 x 11/16
.5	400	1 5/8 x 5/8	2 x 7/8
1.0	400	2 1/8 x 11/16	2 5/8 x 1

Metal-encased capacitors of various types are also subject to similar decreases in size for equivalent ratings. As yet we have not frozen on catalog sizes for such units, either for d-c or a-c applications.

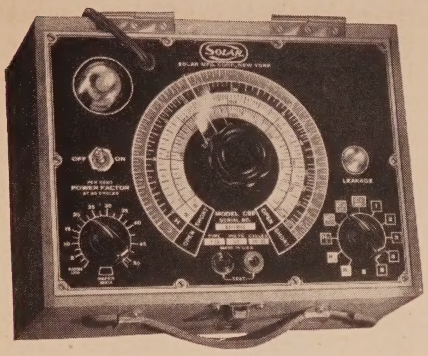
That All-Important Subject—Cost

Some indication concerning the relative cost of metallized paper tubulars in comparison with conventional tubular capacitors is a *sine qua non* for practical veterans of the broadcast receiver business. Based on present cost analyses, it appears that metallized paper capacitors are inherently more expensive than conventional tubulars. It is expected that when sufficient production volume has materialized to justify mechanization of a number of production operations that metallized paper capacitors will more nearly compete in price with conventional designs. Press reports to the effect that metallized paper capacitors are cheaper because of their size reduction over conventional capacitors are unfounded and do not stand up under careful cost analysis.

Summary

Solite metallized paper capacitors are a new departure in capacitor manufacturing technique. A homogeneous aluminum film of negligible thickness deposited on the dielectric replaces the conventional foil and permits operation at higher dielectric stresses without fear of permanent short circuit because of the self-healing characteristics of the film. The resultant capacitors:

(1) Are extremely small in size.
(2) Have long life.
(3) Have low power factor.
(4) Have excellent r-f characteristics.
(5) Are interchangeable with present standard capacitor designs when operated within published ratings.



Portable Analyzer

NEW MODEL CBB CAPACITOR ANALYZER REACHES SOLAR DEALERS

Initial shipments of Solar's new Model CBB Capacitor Analyzer have resulted in favorable comments from Solar distributors and radio servicemen purchasing the new analyzer.

The Model CBB Analyzer is an up-to-the-minute version of the famous Model CB, most widely used capacitor analyzer in the radio service industry, incorporating many war-born improvements for greater utility and dependability.

Addition of a new Wien bridge range extending from 70 mf to 800 mf makes it possible to service post-war sets with very high capacitance filter and by-pass capacitors and to check motor-starting capacitors.

A complete description of this lightweight, portable, all-around analyzer is given in the new Solar Catalog IN-2, which is available on post card or letter request to Instrument Sales, Solar Capacitor Sales Corp., 285 Madison Avenue, New York 17, N. Y.

SOLAR REPLACEMENTS IN PHOTO-FACT FOLDERS

The new Howard W. Sams' "Photo-fact Folders," which give radio servicemen salient service information on new receivers as soon as the sets reach the market, list the recommended Solar replacement capacitors for all sets. The units shown have been chosen with an eye to their reasonable availability from Solar distributors.

SOLAR MEMBER OF ARMY SIGNAL ASSN.

Solar is one of the first group members of the new Army Signal Association, which is devoting itself to a peacetime program of furthering progress in the field of Signals. The new organization provides a long-needed means by which industry and the military may exchange views on problems of mutual interest.

Army Signal Association

Washington, D. C.

THIS IS TO CERTIFY THAT

Solar Manufacturing Corp.

IS A GROUP MEMBER OF THE ARMY SIGNAL ASSOCIATION AND IS ENTITLED TO ALL BENEFITS AND PRIVILEGES PROVIDED IN THE CONSTITUTION. THIS GROUP MEMBERSHIP SIGNIFIES AN ACTIVE AND ABIDING INTEREST IN THE SECURITY OF THE UNITED STATES, PARTICULARLY IN THE REALM OF SIGNALS, WHICH EMBRACES THE COMMUNICATION, ELECTRONIC, MOTION PICTURE AND PHOTOGRAPHIC INDUSTRIES.

EXECUTIVE SECRETARY

June 30, 1947
EXPIRATION DATE

SERVICE NOTES

Solar will pay $2 for each published service note appearing in The Solar System. Material should deal with capacitor problems only and should be addressed to the Service Note Editor.

RCA Victor K60, K80, K81. Intermittent reception or dead receivers on chilly mornings are usually suspected as having oscillator trouble caused by defective 4700 mmf capacitor in the oscillator grid circuit. — Albert Faber, Hudsonville, Mich.

Philco Model 39-45. In these models, poor tone quality and loss of volume were traced to leakage in the coupling capacitors from the phase inverter to the output stage. Replacing with .01 mf, 600 volt Sealdtites will cure the trouble and prevent repetition. — W. S. Butkevich, South Boston 27, Mass.

RCA Victor 215. Intermittent distortion in this radio-phonograph combination was traced to a loose internal connection in the .015 mf capacitor hooked to the special volume control. — John C. Malocsay, Denver 1, Colo.

Stromberg Carlson Model 63. Fading seemed to be caused by faulty avc bypass capacitors. A vtvm check showed a drop from 10 volts to 3 volts on the avc line when the set faded. Replacing the capacitors did not stop the fading. Further checking resulted in discovery of a very leaky electrolytic capacitor which caused the screen voltage on the rf and i-f tubes to drop from 95 to 30 volts. Replacing this capacitor restored full screen voltages and eliminated all fading. — Arthur J. Katz, Bronx 53, N.Y.

Airline Models 62-251-55. If sets of these particular models are found to be noisy, the trouble may be found in the .01 mf, 400 wvdc capacitor connected between the antenna post and the broadcast preselector coil. The replacement should be a .05 mf, 600 volt Solar Sealdtite. — H. J. Sudmeyer, London, Arkansas.

Solar Exam-eter for Intermittents. I had a tough intermittent. The usual test with signal tracer would interrupt the short circuiting. All capacitors tested O.K. but I still suspected capacitor trouble. I connected the "Quick-Check" section of my Solar Exam-eter across the capacitor under suspicion and sat back and waited. When the capacitor started acting up, the meter needle dropped halfway back to null. I replaced the capacitor and the set never gave any more trouble. — Henry E. Nordstrom, Elma, Wash.

Preventive Replacements. In replacing a noisy volume control, the attached audio coupling capacitor often has its leads strained. Intermittent reception follows. It is better practice not to attempt to use the old part but to clip it out and install a new Sealdtite. Faster work, and better work, result as the old leads often are too short. — R. O. Deck, Roodhouse, Illinois.

AC-DC Trouble. In many AC-DC sets, it will be found that a "burned out" pilot light tap (between pins 2 and 3) on the 35Z5 rectifier filament was caused by a shorted line bypass capacitor, which is usually connected from pin 3 to ground. Checking this capacitor and replacing it if shorted or leaky will save a lot of headaches wondering where to get another 35Z5 after burning out the second one. — Donald J. Trainor, Nutley, N. J.

Whistle Elimination. Placing a 50 mf, 150 wvdc Solar Minicap across the B battery of many portable sets will often cure whistling at low B voltages. — George Goldstein, New York, N. Y.

Majestic Model 50. Sudden drop in volume was traced to an intermittent .04 mf capacitor between the center tap of the oscillator coil and the detector tube cathode. — Jerome Hamerling, New York 60, N. Y.

PROSDOCIMI PROMOTED TO VICE-PRESIDENT

Will be in Charge of Solar's International Division

Election of Alcide Prosdocimi as Vice-President in Charge of International Division, Solar Manufacturing Corporation, was announced recently by Paul Hetenyi, President.

Mr. Prosdocimi has been connected of
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Solar Manufacturing Corporation
285 Madison Avenue, New York 17, N. Y.

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REPLY CARD

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Harter, Vice-President in Charge of Sales.

Mr. Corson brings to Solar some fifteen years of experience in the handling of sales and engineering problems in the field of large capacitors. He was formerly Sales Manager of the Power Division of Aerovox Corporation, and Sales Manager of the Power Factor Division of Cornell-Dubilier Electric Corp.

Mr. Corson is a graduate of Massachusetts Institute of Technology and is a member of the American Institute of Electrical Engineers.

SOLAR MEN HONORED

J. I. Cornell, Vice-President in Charge of Engineering, and S. L. Chertok, Manager of Advertising and Technical Service, were among those recently awarded a Certificate of Appreciation by the American Standards Association at ceremonies at the New York Naval Shipyard. The awards to the two men were made in recognition of their wartime assistance in preparing American War Standard and Joint Army-Navy Specifications for electronic components.

Printed in U. S. A. Colorpress, New York

SERVICE NOTES

Solar will pay $2 for each published service note appearing in The Solar System. Material should deal with capacitor problems only and should be addressed to the Service Note Editor.

RCA Victor K60, K80, K81. Intermittent reception or dead receivers on chilly mornings are usually suspected as having
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Stromberg Carlson Model 63. Fading seemed to be caused by faulty avc bypass capacitors. A vtvm check showed a drop from 10 volts to 3 volts on the avc line when the set faded. Replacing the capacitors did not stop the fading. Further checking resulted in discovery of a very leaky electrolytic capacitor which caused the screen voltage on the rf and i-f tubes to drop from 95 to 30 volts. Replacing this capacitor restored full screen voltages and eliminated all fading.—Arthur J. Katz, Bronx 53, N.Y.

Airline Models 62-251-55. If sets of these particular models are found to be noisy, the trouble may be found in the .01 mf, 400 wvdc capacitor connected between the antenna post and the broadcast preselector coil. The replacement should be a .05 mf, 600 volt Solar Sealdtite.—H. J. Sudmeyer, London, Arkansas.

Solar Exam-eter for Intermittents. I had a tough intermittent. The usual test with signal tracer would interrupt the short circuiting. All capacitors tested

leads often are too short.—R. O. Deck, Roodhouse, Illinois.

AC-DC Trouble. In many AC-DC sets, it will be found that a "burned out" pilot light tap (between pins 2 and 3) on the 35Z5 rectifier filament was caused by a shorted line bypass capacitor, which is usually connected from pin 3 to ground. Checking this capacitor and replacing it if shorted or leaky will save a lot of headaches wondering where to get another 35Z5 after burning out the second one.—Donald J. Trainor, Nutley, N. J.

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SOLAR MANUFACTURING CORPORATION
285 MADISON AVENUE
NEW YORK 17, N. Y.

Whistle Elimination. Placing a 50 mf, 150 wvdc Solar Minicap across the B battery of many portable sets will often cure whistling at low B voltages. — George Goldstein, New York, N. Y.

Majestic Model 50. Sudden drop in volume was traced to an intermittent .04 mf capacitor between the center tap of the oscillator coil and the detector tube cathode. — Jerome Hamerling, New York 60, N. Y.

Philco Model 45. Detector load current causes noisy volume controls. The remedy is to change the circuit by placing a .01 Sealdtite in series with the high side of the control and to connect a 350,000 ohm, ½ watt resistor from the other side of the capacitor to the chassis. — Cedric W. Tews, Milwaukee, Wis.

Zenith Chassis 8A04. This combination would not oscillate on the high end of the broadcast band, cutting out at about 1200 kc. Everything else was checked and the trouble found in the 250 mmf mica capacitor between the oscillator plate and coil. — Jack Darr, Mena, Ark.

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PROSDOCIMI PROMOTED TO VICE-PRESIDENT

Will be in Charge of Solar's International Division

Election of Alcide Prosdocimi as Vice-President in Charge of International Division, Solar Manufacturing Corporation, was announced recently by Paul Hetenyi, President.

Mr. Prosdocimi has been connected with Solar since 1931. A graduate of the University of Mexico and holder of a degree in Electrical Engineering from Columbia University, he was previously connected for many years with the Bell System, having been successively with the Research and Development Division of American Telephone and Telegraph Company, Western Electric Company, and Electrical Research Products, Inc., in this country and abroad.

DON E. CORSON HEADS SOLAR SPECIAL PRODUCTS

Appointment of Don E. Corson as Manager of the Special Products Division of Solar Manufacturing Corporation, was announced recently by W. C. Harter, Vice-President in Charge of Sales.

Mr. Corson brings to Solar some fifteen years of experience in the handling of sales and engineering problems in the field of large capacitors. He was formerly Sales Manager of the Power Division of Aerovox Corporation, and Sales Manager of the Power Factor Division of Cornell-Dubilier Electric Corp.

Mr. Corson is a graduate of Massachusetts Institute of Technology and is a member of the American Institute of Electrical Engineers.

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SOLAR

With the passing of another year, and as a new course is charted, we wish for you ever brighter skies and always fair weather ahead. At this holiday season we are grateful for friendships that have meant so much through stormy months of the past.

May good fortune and success pilot you safely on your voyage through the New Year.

SOLAR MANUFACTURING CORPORATION

Chairman of the Board

President